Addendum to Statement of Basis
CDOT Region 6 Headquarters Site
2000 South Holly
Denver, CO
EPA #CO5000-04976

The decision to inject nutrients (ammonium nitrate and potassium phosphate), oxygen releasing compound, and a co-metabolic food source as part of a three-month duration, in-situ, biodegradation, pilot-scale test at this site was based on the results of a treatability study. The treatability study was performed on contaminated water from the site as a laboratory bench scale test to determine what microbial populations were present and what agents could be added to enhance bioremediation at the site. The results of the treatability study indicated that:

- The existing microbial population contains a subpopulation of methylene chloride-utilizing microorganisms within a range acceptable for biological degradation.
- The existing groundwater pH and the nutrient nitrogen levels in groundwater could limit the effectiveness of biological degradation of methylene chloride.
- The addition of nutrients and oxygen enhanced the growth of the methylene chloride-utilizing microbial population and high concentrations of methylene chloride were reduced rapidly and effectively in the laboratory.

This pilot test is the next level of verification of the lab scale results before deciding whether this method will be successful as a full scale remediation strategy. The test injections will be located in the highest concentration portion of the plume, and will be conducted under the "worst-case scenario." Therefore, positive results should be definitive.

It should be noted that methylene chloride is the contaminate of the highest concentration at the site. Other chlorinated organics are present, but in much lower concentrations. The methylene chloride chemical structure is readily amenable to biodegradation. The other constituents [1,1-dichloroethene (1,1-DCE), trichloroethene (TCE), and tetrachloroethene (PCE)] are more difficult to degrade, but this pilot test is also designed to test effectiveness of the co-metabolism of these lesser constituents. The injectate includes constituents that should enhance this co-metabolism.

Other remediation technologies are being considered, such as excavation of the hosting aquifer material and air sparging. The decision to conduct this injection pilot test scale was made in conjunction with CDPHE RCRA staff, because it appeared to be the most promising based on the treatability study, and the quickest strategy to achieve compliance with MCLs at the property boundary, a condition of the consent order at this site. This injection strategy is also being considered for use at another CDOT site, located at Louisiana and Colorado, where methylene chloride is present in the groundwater. An exhaustive evaluation of available remediation technologies was performed for the Louisiana and Colorado site. Based on this evaluation, injection technology was selected for pilot testing at the South Holly site.